

We claim:

1. A gene chip, characterized by 100-20,000 Micro-Reactors (MRs) on the same plane; Polymerase Chain Reaction (PCR) can be performed in the MRs. The MRs are connected by a set of pipeline, through which a sample can flow into all the MRs. A set of reactive media exits in each of the MR, then PCR can be performed simultaneously under the same condition. Real-time quantification can be carried out by detecting the change of the optical density in the MR through its top surface, which is transparent.

2. In all the MRs of the chip of claim 1, PCR can be performed simultaneously, after the infusion of a little amount of genomic DNA or degenerative cells from human beings, animals or plants into the MR. Therefore more than 100 kinds of gene variants such as gene mutation, gene deletion or gene rearrangement can be detected in just oncereaction.

3. The chip of claim 1, wherein said material is silica or plastic which is able to endure the temperature of 0-99°C for up to 24 hours.

4. The chip of claim 1, wherein said agents in the reactive media are adsorbed by magnetic beads whose diameters are in nanometer level. The said micro-beads will be immobilized on the bottom of the MRs by exogenous magnetic force when samples are infused. Magnetic stirring apparatus will be employed to accelerate the reaction.

5. The chip of claim 1, wherein said PCR primers in the reactive media are made up with primers to amplify multifarious functional genes, immobilized on the bottom of the MRs after being mixed.

6. The reactive media of claim 1 includes a kind of fluorescent probe, which is labeled by a pair of fluorescent dyes. Fluorescence can not be detected due to an interactive mechanism called "FRET (fluorescence remit energy transformation)" between the two dyes. Polymerase will digest the inhibitor of fluorescence on one end when the probe combines the PCR product, then the fluorescence on the other end of the probe turns into detectable and the PCR product can be distinguished.

7. The fluorescent probes of claim 1 can be replaced by probes labeled with other chromogenic agents.

8. The top surface of the MRs of claim 1 is transparent. The optical density of the fluorescence or other dyes in the MRs can be detected through the said surface. The optical density of the dyes is in proportion to the amount of the PCR product. Image collector will monitor the real time change of the optical density and transfer the data collected into the image analysis system of the computer software.

9. The reactive media of claim 1, wherein said polymerase is heat-activated, the efficiency of the PCR is higher than that of PCR using common polymerase.